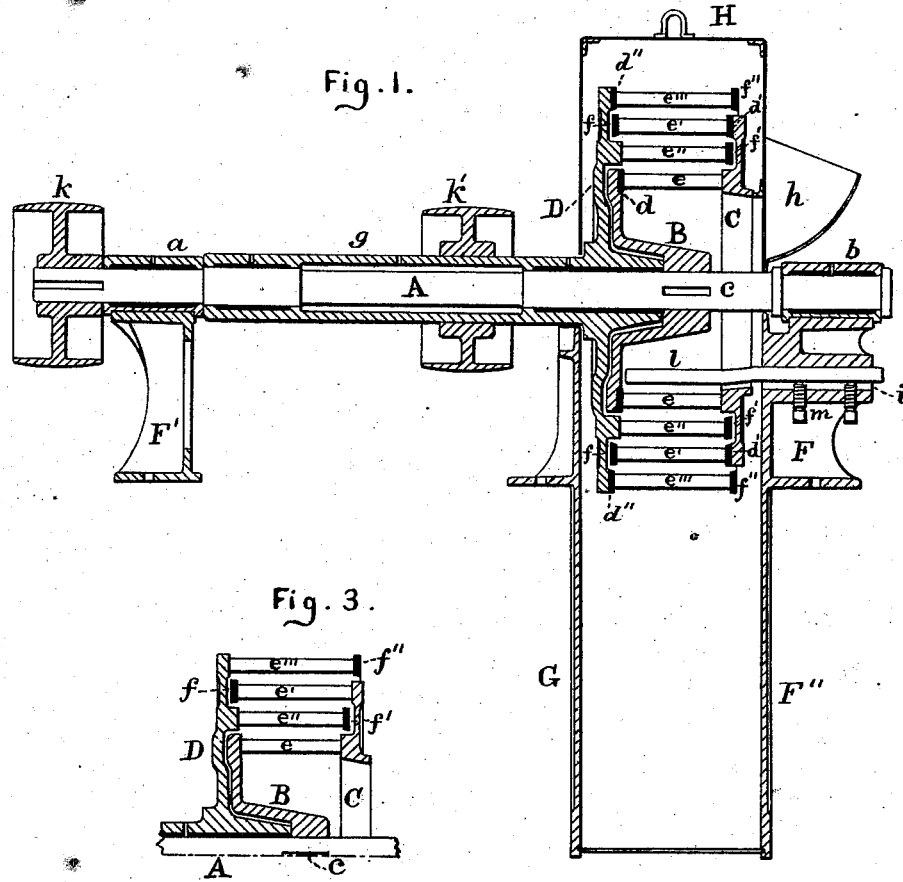


G. B. DAVIDS.  
Disintegrating-Mill.

No. 160,884.

Patented March 16, 1875.



Witnesses:

*H. A. Daniels*  
*Carroll Webster*

Inventor:

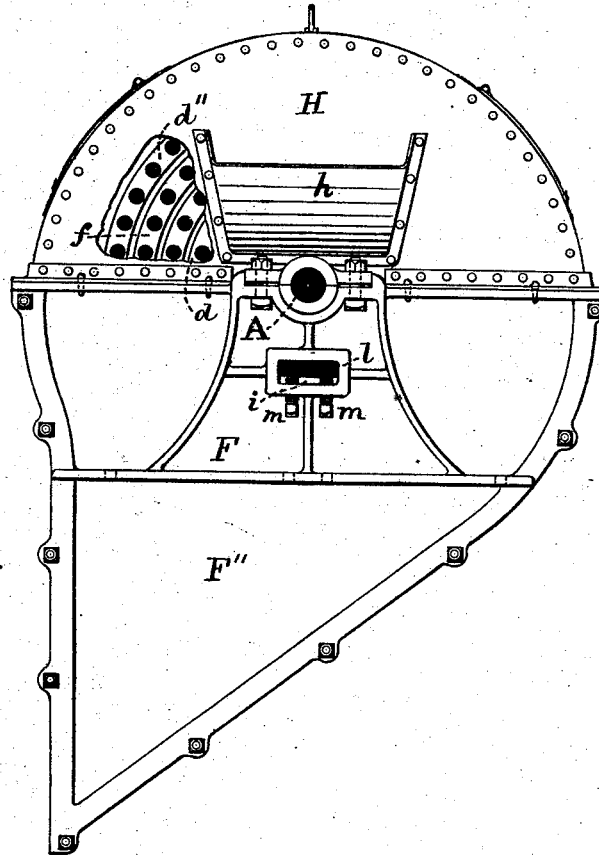
*Garret B. Davids*  
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*Attorneys.*

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Fig. 2.



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# UNITED STATES PATENT OFFICE.

GARRET B. DAVIDS, OF BALTIMORE, MARYLAND, ASSIGNOR TO HIMSELF  
AND TALBOTT DENMEAD, OF SAME PLACE.

## IMPROVEMENT IN DISINTEGRATING-MILLS.

Specification forming part of Letters Patent No. 160,884, dated March 16, 1875; application filed  
February 10, 1875.

*To all whom it may concern:*

Be it known that I, GARRET B. DAVIDS, of the city of Baltimore, in the State of Maryland, have invented certain Improvements in Disintegrating-Mills, used for the grinding of grain, bones, ores, and other material capable of disintegration, of which the following is a specification; and I do hereby declare that in the same is contained a full, clear, and exact description of my said invention, reference being had to the accompanying drawing and to the letters of reference shown thereon.

My invention relates to improvements in that class of disintegrating-mills consisting of mounted cages running in opposite directions, through which the material to be disintegrated is thrown by centrifugal force from the center of the machine, and thereby disintegrated. The active agents in this disintegration consist of pins or beaters secured to disks, and stiffened at their ends by rings, the said disks, pins, and rings mounted upon shafts, forming the oppositely-revolving cages aforesaid.

My present invention relates, first, to strengthening or re-enforcing of the faces of the said disks at the point of union therewith of the pins, by adding to the disks rings of iron, steel, or other metal. The disks are subjected to great strain and shocks by the constant collision of the pins with the material in course of grinding or disintegration, which shocks are largely transmitted to the said disks at the points whereat the pins connect therewith, and tend ultimately to weaken them, so as to render them unserviceable.

My invention relates, secondly, to the construction and relative arrangement of the disks aforesaid upon their respective shafts, whereby the revolving parts of the mill are the better balanced, the strain thereon better distributed, and the wear of the operative parts of the machine lessened.

My invention relates, thirdly, to a novel construction and arrangement of a portion of the frame of the machine, admitting of the convenient insertion and removal of a knife or breaker into and from the mill, by means of which knife or breaker the material is first broken and prepared for the action of the

aforesaid disintegrating parts of the machine. This part of my invention is designed to allow of the insertion or removal of the knife or breaker without involving the taking apart of the mill or the displacement of any of the other working parts thereof.

In the accompanying drawing, Figure 1 is a vertical section of a mill embracing my improvements. Fig. 2 is a side view of the mill, showing certain parts of my improvements; and Fig. 3 is a vertical section through a part of the mill, showing a modified form of my invention.

Similar letters of reference indicate similar parts in all the views.

A is a solid shaft, resting in the bearings *a* and *b*. Upon this shaft is mounted the cast-iron disk B, keyed to the shaft at *c*. The inner face of the disk is re-enforced at its periphery by the metal ring *d*, which is preferably set back, so as to be flush with the inner face of the disk. The disk B is united by the pins *e* to the opposite disk C, the inner face of which, at the periphery of the disk, is also re-enforced by a metal ring, *d'*, secured thereto, and forming a strengthened seat for another series of pins, *e'*, which run across to a ring, *f*, in which they are inserted. The disks B and C, with their re-enforcing rings *d* and *d'*, pins *e* *e'*, and ring *f*, form one complete cage, adapted to revolve in one direction upon its shaft A. The disk B is recessed at its outer side, to admit of the reception of the inner part of the disk D, which reaches to a point near the vertical center of the machine. The cages of the mill are thus balanced in a manner not attainable without the adoption of this expedient, and wear of the parts is greatly lessened. The hollow shaft *g*, extending from the disk D, surrounds the shaft A, and has its bearings thereupon, the bearings being supplied with some anti-friction substance. The disk D is supplied with a series of pins, *e''*, extending across to a ring, *f'*. The inner face of the disk D is supplied also with a re-enforcing ring, *d''*, secured thereto, into which and the disk the pins *e'''* are riveted or fastened, extending across to the ring *f''*. The disk D, with its pins *e''* *e'''*, re-enforcing and stiffening rings *d''*, *f'*, and *f''*, and its shaft,

form the second cage, which is caused to revolve in a direction opposite to that taken by the other cage aforementioned. The two cages are revolved in their respective ways by means of the pulleys *k* and *k'*, secured upon their respective shafts. The frame *F* sustains one end of the solid shaft *A*, the frame *F'* supporting the other end thereof. The frames *F* *F'* rest upon the floor level, the plate *F''* extending from the frame *F*, and forming one side of the lower casing of the mill, a corresponding plate, *G*, extending from the supplemental and non-supporting frame opposite to that *F*. The upper casing *H* of the mill is of sheet-iron, with angle-iron stiffeners, and rests upon and is secured to the frame of the machine. The receiving-hopper is represented by *h*. The frame *F* is provided with an opening, *i*, in which the knife or breaker *l* is placed, and held by strong set-screws *m*. The opening *i* is strongly surrounded, and of sufficient height to admit of the insertion and removal of the knife, which is bent, as shown, to bring it into close proximity with the series of inner disintegrating-pins. The knife is made strong enough to withstand the violent shocks to which it is subjected.

Fig. 3 shows the disks not re-enforced with the rings aforesaid.

The general feature of recessed disks of each cage (admitting of the entrance of the other cage, described and claimed in my Letters Patent, granted December 14, 1869,) it will be seen, is shown herein.

An enlarged experience of several years has shown the advantages to be derived from that arrangement in preventing unground material escaping from the mill, and the recesses

or rabbets in the disks are retained in the construction of mill herein shown.

Having described my invention, what I claim as new, and wish to secure by Letters Patent of the United States, is—

1. The disks forming parts of the oppositely-revolving cages of disintegrating-mills, provided with re-enforcing rings, substantially as and for the purpose specified.

2. The cage of the mill, consisting of the recessed or rabbeted disk *D d''*, pins *v'' e'''*, and rings *f' f''*, in combination with the cage consisting of the disk *B d*, pins *e*, disk *C d'*, pins *e'*, and ring *f*, the two cages being mounted and running independently upon oppositely-revolving shafts, substantially as herein set forth.

3. The combination of the disk *B*, mounted upon its solid shaft, and disk *D* at the end of its hollow shaft, the projecting hub of the disk *D* entering the recessed hub of disk *B*, substantially as herein specified, for the purpose of balancing the mill as set forth.

4. In a disintegrating-mill having oppositely-revolving cages, as herein specified, the combination of the frame *F*, having the opening *i*, knife or breaker *l*, and set-screws *m*, substantially as herein shown, admitting of the vertical adjustment of the said knife or breaker, for the purpose specified.

In testimony whereof I have hereto subscribed my name, in the city of Baltimore, this 5th day of February, in the year of our Lord 1875.

GARRET B. DAVIDS.

Witnesses:

FRANCIS F. PEPPERCORN,  
CHARLES KRAUSE.